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ABSTRACT

This digest presents a case for the development of a precise definition of environmental literacy (EL) as a prerequisite to setting standards for environmental education. The discussion includes the following: (1) establishment of the relationship between EL, environmental education, and goals of the formal education system; (2) the development of the meaning of EL; (3) contrast between EL and other applications of the term "literacy"; (4) levels of EL; and (5) attributes of the environmentally literate. The report distinguishes between scientific literacy and EL, the former appearing to be built on a mechanistic paradigm and the latter built on an ecological paradigm. EL draws upon six major areas: sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement. These are collected into four strands: knowledge, skills, affect, and behavior, that need to be addressed in education for EL. It is concluded that more work needs to be done to refine the components of environmental literacy and correlate these components with formal and nonformal education development levels. The education system should also be encouraged to adopt EL as part of its mission. (Contains 9 references.) (MCO)

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Environmental Literacy

John F. Disinger & Charles E. Roth

The creation of an environmentally literate citizenry is the bottom-line goal of environmental education. This goal does not mean, however, the same thing to everyone. Although the term *environmental literacy* has been used for more than two decades, it continues to lack precise definition. It has received a good deal of attention since 1968 and creates positive images while conveying little in the way of substantive information or direction. Renewed interest in environmental education affords an opportunity to reconsider and highlight the interrelationships between environmental education and environmental literacy and to define the latter so it can be a useful term and concept.

The 1990 National Environmental Education Act (Public Law 101-619) has brought environmental education back to the attention of many educators and most environmentalists (Marcinkowski, 1990-91), though how much impact this will have on educational decision makers remains to be seen. At present, as in the past, educational leaders show little direct interest in education about the environment, except as it may be subsumed by traditionally defined curricular areas. The 1970 Environmental Education Act, for example, received essentially no priority from the U. S. Department of Health, Education, and Welfare, where it was housed. Over the years, significantly greater interest has been demonstrated by conservationists and environmentalists. Environmental quality is their priority, and they see education as a mechanism for promoting it. For this reason, the 1990 Act is receiving significant attention from its host unit, the U. S. Environmental Protection Agency, and from conservationists and environmentalists, in general.

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The promotion of citizenship education, often for adults as well as school children, is typically identified as the primary task of schooling. A continuing assumption is that the success of the formal education system is essentially defined by its ability to prepare individuals to be citizens—i.e., to function effectively in today's and tomorrow's society (America 2000, 1991). To achieve this goal, the development of both general and specific literacies is essential.

How Is "Literacy" Defined?

In its earliest uses, the term literacy referred solely to the ability to read and write; one either could or could not. In point of fact, the term "illiterate" predated the positive term with respect to general literacy, as literacy, mathematical literacy, computer literacy, visual literacy, cultural literacy, and so on. As described by Michaels and O'Connor (1990):

> Literacy...is an inherently plural notion. We each have, and indeed fail to have, many different literacies. Each of these literacies is an integration of ways of thinking, talking, interacting, and valuing, in addition to reading and writing...Literacy then is less about reading and writing per se, and is rather about ways of being in the world and ways of making meaning with and around text.

Although environmental literacy is not identified by direct reference in most discussions of educational goals, it may be inferred from considerations of specific literacies such as those identified in *America 2000*. This *Digest* deals with environmental literacy as a specific literacy. Most of its content is derived from a 1992 monograph by Charles E. Roth, the 1968 originator of the concept. His monograph, available from ERIC/CSMEE, traces the roots, evolution, present status, and future prospects of environmental literacy.

Are Standards Possible?

Since 1989, an environmental education task force of the American Society for Testing and Materials (ASTM) has sought the establishment of consensus standards for environmental education. ASTM assumed organizational leadership at the request of the Federal Interagency Committee on Education's Subcommittee on Environmental Education (FICE/SEE). Professional leadership and participation comes from individuals who are experienced and active in environmental education. A first task, on which advancement of other tasks depends, is defining environmental literacy.

Most literacies are defined in cognitive terms. Knowledge is a necessary pre-condition of thoughtful behavior and action. Educational systems usually limit their operational objectives to the attainment of knowledge and skills related to their effective and efficient acquisition; they do not actively promote the pro-active development of "responsible environmental behavior," as described by Hungerford (1987). Individual and societal environmental behavior, however, belies the assumption that behavioral change follows directly from development of necessary knowledge and skills (Iozzi, 1989).

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Since the term was coined, a distinguishing characteristic of environmental literacy has been its "action" perspective:

> Environmental literacy is essentially the capacity to perceive and interpret the relative health of environmental systems and take appropriate action to maintain, restore, or improve the health of those systems...
>
> Environmental literacy should be defined...in terms of observable behaviors. That is, people should be able to demonstrate in some observable form what they have learned—their knowledge of key concepts, skills acquired, disposition toward issues, and the like. (Roth, 1992).

Levels of literacy are generally assumed to exist but are not often defined. With respect to environmental literacy, Roth proposed the identification of three levels:

- *Nominal*, indicating "ability to recognize many of the basic terms used in communicating about the environment and to provide rough, if unsophisticated, working definitions of their meanings";
- *Functional*, indicating "a broader knowledge and understanding of the nature and interactions between human social systems and other natural systems"; and
- *Operational*, indicating "progress beyond functional literacy in both the breadth and depth of understandings and skills."

What Are the Attributes of the Environmentally Literate?

In expansion of the above, Roth specifies that:

> Persons at the operational level routinely evaluate the impacts and consequences of actions, gathering and synthesizing pertinent information, choosing among alternatives, advocating action positions, and taking actions that work to sustain or enhance a healthy environment. Such people demonstrate a strong, ongoing sense of investment in and responsibility for preventing or remediating environmental degradation both personally and collectively, and are likely to be acting at several levels from local to global in so doing. The characteristic habits of mind of the environmentally literate are well ingrained. They are routinely engaged in dealing with the world at large.

For educators, a complication is the interdisciplinary nature of environmental literacy. Many educators apparently assume that environmental literacy is equivalent to, or a subset of, scientific literacy. There is good reason for making this assumption: "...environmental education has not been infused equally within the curriculum, but tends to be treated mostly as an enrichment of the science program." (Simmons, 1989). Beyond that, science educators have demonstrated more interest and involvement in environmental education than have others. The danger, Roth argues, is that scientific literacy appears to be built on a mechanistic paradigm, whereas environmental literacy builds on an ecological paradigm. More simply, environmental literacy derives its focus from four basic issues that take it well beyond the typical boundaries of science education, or any of the traditional disciplines:

- the interrelationships between natural and social systems;
- the unity of humankind with nature;
- technology and the making of choices; and
- developmental learning throughout the human life cycle.

Thus, environmental literacy draws upon six major areas: environmental sensitivity, knowledge, skills, attitudes and values, personal investment and responsibility, and active involvement. In Roth's descriptions of the specifics of literacy level, environmental sensitivity and attitudes and values are subsumed under the term "affects," while personal investment and responsibility and active involvement are subsumed under the term "behavior." This creates four strands—*knowledge*, *skills*, *affect*, and *behavior*—to be addressed in education for environmental literacy.

Conclusion

More work remains to be done to refine the components of environmental literacy. These refinements need to be keyed to general developmental levels in formal education and to the opportunities provided by nonformal education. Effort needs to be extended to encourage each component of the broad educational system, formal and nonformal, to accept as part of its mission the fostering of environmental literacy. If each does a more effective job of nurturing environmental literacy, more individuals will achieve higher degrees of competency on the environmental literacy continuum.

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